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PERSONALITY CHARACTERISTICS OF DENTAL STUDENTS

Paul Heist*

A scientific interest in the nature and educational implications of individual differences had its origin in the first two decades of the present century. Some attempts to identify and measure significant characteristics of college students actually came before the year 1900.[1] However, it was not until the years just

[1] J. McKeen Cattell and L. Farrand, "Physical and Mental Measurements of the Students of Columbia University," Psychological Review, III (1896).

preceding the Second World War, when a number of investigations were for the first time directed to the measurement of attitude change, that much emphasis was given to personality assessment of large groups of students. Two prominent examples of such studies were those conducted by Nelson[2] and Newcomb[3].

[2] Erland N. P. Nelson, "Radicalism-Conservatism in Student Attitudes," Psychological Monographs, L (1936), No. 4.

[3] Theodore M. Newcomb, Personality and Social Change: Attitude Formation in a Student Community (New York: Dryden Press, 1943).

In the course of the present decade, research on large numbers of students in colleges, universities, and professional schools has expanded to unforeseen

*Arrangements for the collection and analysis of these data, for this and subsequent reports, were made by Dr. T. R. McConnell, Chairman, Center for the Study of Higher Education. The author also wishes to acknowledge the efforts and assistance of other research personnel at the Center.

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proportions. As a single example, the majority of the research projects at the Center for the Study of Higher Education at Berkeley are concerned with important personality characteristics and the growth and development of students--students categorized by college class, institution, type of institution, major academic and professional programs.[4, 5, 6, 7] One of these major projects is a collaborative study with research staff of the American Dental Association and the Association of American Medical Colleges on the characteristics of students in their member institutions.[8]

[4] T. R. McConnell, "The Diversification of American Higher Education: A Research Program," Educational Record, October, 1957.

[5] Paul Heist, "Diversity in College Student Characteristics," Journal of Educational Sociology, (In print). 1960.

[6] T. R. McConnell and Paul Heist, "Do Students Make the College?" College and University, Summer, 1959.

[7] Martin Trow, "Some Implications of the Social Origins of Engineers," Scientific Manpower (Papers of the Seventh Conference on Scientific Manpower), National Science Foundation, 1958.

[8] Mrs. Grace Parkin, Director, Division of Educational Measurements, Council on Mental Education, and Dr. Helen Gee, Director of Research, Association of American Medical Colleges, have been responsible for various aspects of these studies.

This paper is limited to a rather general review of some of the major psychological characteristics of dental students, with some attention given to their significance for professional education and professional careers. Leaders in

dentistry have made it known that not only is there a need for many more dentists, today and in the immediate as well as the more remote future, but that there is also a growing concern over the recruitment and selection of dental students. A number of dental school deans, speaking informally in a recent national conference, manifested considerable anxiety, both over the motivation and apparent values of many who enter the profession and over the virtual absence of candidates in most institutions for careers in research and teaching. The concern over mo ivation and values is, in part, the topic of a current investigation conducted jointly by the University of California School of Dentistry and the staff at the University of California Counseling Center.[9]

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[9]Dr. Herbert Hackett, U. C. Counseling Center, is supervising this particular project.

The major questions to which this paper is addressed are: what are the personality characteristics, values, attitudes, and interests typical of present-day dental students? What are the inferences one might draw from their measured characteristics regarding the students' motivations and aspirations? And, what are the implications of these data for the quality of scholastic achievement and for the hope of supplying the need for research and teaching personnel from the present student bodies of the dental schools?

As part of the larger study of differential selectivity mentioned above, both of professions and professional schools, and of the education and development of students in the two major health services, several personality inventories were administered to all entering students in nine presumably "representative" American dental colleges in the fall of 1956. These nine dental institutions (hereafter referred to as the NDI sample or study) were selected to provide approximately a

20 per cent sample (N = 613) of the total entering student population and to be representative of the type and variety of schools in the nation. The selection criteria included type of affiliation or control (public vs. private), geographical region, and specific characteristics or emphases of curricular programs. From some limited data available on the dental students in all schools in the country, it would seem that the over-all NDI sample is equivalent in quality and composition to, any sample of students or institutions that might have been drawn completely at random.

The staff of the Council of Dental Education of the American Dental Associa- made data available on the entering freshmen of 1952 in all dental schools; this information furnishes one basis for determining representativeness of the sample of nine institutions. The mean score on the American Council on Education Psychological Examination for the NDI sample is between two and three points higher than the mean score of entering freshmen in all dental schools. The NDI distribution of students' fathers' occupations is very similar to the distribution of all dental students in 1952, with the exception that in the NDI group more students come from the skilled trades and fewer from the nonskilled occupations. Part of this difference may be attributed to variations in classification procedures.

In a survey by the Council on Dental Education[10], conducted during the year 1953-1954, data were collected on students in all classes in 39 schools, 90 per cent of the total dental student body. Some of the data permit comparisons with

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[10]Council on Dental Education (Reports of Councils and Bureaus), "Dental and Dental Hygiene Students: Their Characteristics, Finances and Practice Plans. Characteristics of Dental Students," Journal of the American Dental Association, LII (January, 1956).

the information obtained from the NDI freshmen under consideration here. The categories of fathers' occupations outside of the professional fields are not the same and cannot be directly compared, but for those students with fathers in the professions, the figures are 25.6 per cent in the 39-school sample and 22.3 per cent for the NDI sample. The percentages coming from the homes of dentists and physicians in the large 39-school sample are identical to the figures for all entering freshmen of 1952 (see above), 10.7 and 3.1 per cent, respectively. These compare with 6.7 and 1.6 per cent for students in the nine selected colleges (NDI) in 1956. The percentages of students whose fathers were dentists in the nine schools varied considerably; the small percentages of fathers who are physicians are much more consistent across these schools than is the case for fathers in dentistry. Perhaps the most stable category across the nine schools is found in the large percentages (between 60 and 70 per cent) in the conglomerate occupational group called "skilled." This is unfortunately a nondescript category which includes a large number of managers and proprietors (30 per cent in the Council of Dental Education 39-school study). However, the largest proportion, nearly one-half the students in any of these samples, comes from all other skilled, semiskilled and unskilled occupations.

In the Council study of the students in all classes in the school year 1953-1954, attention was called to the large percentage of married students. Even among the ranks of the freshmen in this group, 31 per cent were married; the relatively large number of older veterans was perhaps in considerable part responsible. In the smaller NDI freshman sample of 1956, which included relatively few veterans, 23.6 per cent of these male students reported being married. However, very low percentages in two out of the nine schools depressed this total figure. In the remaining seven institutions, the proportion of married freshmen would have been above the 1953-1954 figure.

Some discrepancy appears between the NDI and the 39-school samples on the amount of predental education reported. The results of the Council survey show an increasing trend toward more preprofessional education. The authors indicate that 45 per cent of the nonveteran entrants had completed at least four years of college, and only 23 per cent entered with two years. In the NDI sample, although there is some variation among the nine schools, only 37 per cent had four or more years to their credit and 27.4 per cent entered with two years of college. Also, five per cent fewer in the NDI sample, as compared to the schools in the Council study, had three years of preprofessional education. The NDI schools, as a group, do not seem to be enrolling students with the increasing amount of previous college education typical of the reported trend. To confirm this, of course, one would need to know the percentages for the respective schools for the fall of 1953.

On the whole, the approximately 20 per cent NDI sample of the first-year students appears to be quite representative of dental students in general. In measured academic aptitude the mean score for the nine institutions is a little above the national average for entering students. The picture as to occupation of father and marital status closely resembles that for the entering students in all dental schools. Only in the amount of predental education is the NDI sample not typical of the over-all picture.

Personality Description (heavy black print)

The following description of the "personalities" of the students in dental schools in America is strengthened considerably by the use of several different personality inventories in the total NDI sample. The three measuring devices employed were the Edwards Personal Preference Schedule,[11] the Allport-Vernon-Lindzey Study of Values[12] and the Strong Vocational Interest Blank.[13]

[11]Allen L. Edwards, Personal Preference Schedule, Manual (New York: The Psychological Corporation, 1954).

[12]Gordon Allport, Philip E. Vernon, and Gardner Lindzey, Study of Values, Manual of Directions (Massachusetts: Houghton Mifflin Company, 1951).

[13]E. K. Strong, Jr. Vocational Interests of Men and Women (Palo Alto, California: Stanford University Press, 1943).

The reader should keep in mind that the average scores, representing a supposedly typical dental student, refer to a hypothetical person. No single student is quite like the "typical" individual portrayed in the average scores. One is only able to infer about a general pattern of attitudes and motivation which, to varying degrees, would be descriptive of the majority of individuals in this sample. As far as the nine dental schools are concerned, some student bodies are more accurately described by the mean scores of the total group than are others.

The results on each of the three inventories will be presented briefly without tabular presentation of data.[14] Some implications are suggested where the particular results relate directly to the major questions raised at the beginning of this paper. Rather than giving the results of all the scales (dimensions) included in each of the three inventories, discussion and description will be limited to the scales that differentiate this group from the scores of the normative groups[15] or from a few comparable groups in other professions.

[14]Future reports, including data from students in both the dental and medical professions, will present all available data.

[15]The normative groups, separately established for each sex, for the Personal Preference Schedule and the Study of Values were college students; in the case of the Vocational Interest Blank, they were men or women successful (by various criteria) in the respective professions.

The three personality inventories differ essentially from each other in the specific aspect of personality measured. The scaled variables on the Edwards Personal Preference Schedule represent manifested needs of human beings; these needs, 15 in number, may be viewed as largely a product of the past experiences of the individual, compounded with hereditary factors in various degrees.

The Study of Values measures six basic values or dominant interests. These are called: Theoretical, Economic, Aesthetic, Social, Political, and Religious. The utility of this six-way classification of a person's thinking is based on an assumption that the personalities of men are most readily understood or explained by their values and evaluative attitudes.

The Strong Vocational Interest Blank provides scores on each of 45 occupational scales and on three more general interest scales (Interest Maturity, Occupational Level, and a Masculinity-Femininity Index). On each of the 45 occupational variables an individual's measured interests are compared to the measured interests of large groups of persons who have been successful in the particular occupations. Thus, a high score on Architecture, for example, shows the individual to have interests very similar to those of successful architects and not specifically an interest in architecture per se or in becoming an architect.

The measurements in all three inventories are relative in that the individual who responds to the statements is required to choose one statement over another one or more, a procedure that gives a profile of relative values, needs or interests.

This results in a fairly clear identification of the highest (or higher) and lowest (or lower) values of the six in the Study of Values but in no absolute measurement of any of them. The same form of measurement on the more complex Vocational Interest Blank and the Personal Preference Schedule results in less precise differentiations of highest and lowest characteristics.

The Personality Needs

The personality of the average dental student appears to be different from that of the average undergraduate college student in a number of significant aspects, since the scores for dental students on a number of need-assessment scales of the Personal Preference Schedule indicate definitive differences. From the standpoint of these measured needs, the following characteristics are delineated for the dental student:

(a) He is somewhat other-directed rather than inner-directed (in Riesman's terms) in being concerned about what others think and in wanting to be seen as proper and "right," in tending to defer to others and in exhibiting no real need to take independent stands. He is more authoritarian than nonauthoritarian in his need to conform to the conventional and the traditional, in his more frequent identification with conservative rather than with liberal thinking. In the area of human relations and social endeavors, he appears to have little need to assume responsibility or to attempt to guide or direct the efforts of others.[16]

(b) He is somewhat inflexible and has no great need to change or to seek out the new and different. He is instead generally ready to accept or to leave things as they are.[17]

(c) He has considerable need for living in an organized and self-regimented fashion. Also, he gains satisfaction from neatness and from his awareness of details. For many this would be true to the point of appearing compulsive.[18]

(d) He is persistent and not readily distracted either from immediate tasks or more remote goals. In this sense he is an achiever, in spite of the fact that he does not particularly need to acquire recognition or to exceed others. He responds or behaves as if his goals were generally attainable and within his "level of aspiration" and not as if he were "shooting for the stars."[19]

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[16]These characteristics are indicated, as major and subsidiary factors, by the mean scores, which are significantly different (.01 to .05 level) from the normative scores, for the total NDI sample on three PPS scales: high on Deference and low on Autonomy and Dominance. The great majority of the nine institutional groups are also significantly high or low on the respective scales.

[17]Indicated chiefly by significantly low mean scores on the Change scale for the total NDI sample; the mean scores for all but two institutional groups are also significantly below the normative mean.

[18]Indicated by significantly high scores on the Order scale and indirectly supported by the low scores on Autonomy and Change. The total group and all institutional groups are significantly high on Order.

[19]High scores on the Endurance scale, average scores on Achievement and low scores on Dominance. All institutional groups but one are significantly high on Endurance and all but two are significantly low on Dominance.

Two of the above characterizations may appear to give an overly negative connotation to the need-structure of the dental student. The reader is reminded that the difference in mean scores between the NDI sample and college students in general must be seen as more or less of a measured trait or characteristic rather than as the presence or absence of it in a person's behavior. Also, the behavior as characterized under a and b is not unique to dental students but much like the

majority of people in our society. However, to find such attitudes in a professional group, assuming the attitudes persist to graduation and do not change, is perhaps a bit surprising. What these results might imply for the education of these individuals is more noteworthy and of real significance.

Major Values

As with the behavior of all human beings, the values to which dental students subscribe may be considered basic to their roles and to their aspirations for the future. Unfortunately, there is no single, comprehensive inventory or questionnaire which permits objective measurement of all important values for any individual or group. Though limited to six basic values, one advantage of the Study of Values, like the other inventories utilized in this project, centers largely in the comparisons that can be made with other persons and groups. Also, as mentioned previously, the particular structure of the inventory results in a pattern of scores denoting areas of greatest value or personal emphasis and other areas of least value. Thus, this relativity of measurement across the six scales lends itself to one form of interpretation, a rank ordering of values, that derives directly from the respondent's perception. Beyond the usual mean score comparisons among groups, the interrelatedness of the scales suggests that it is especially meaningful to determine on what scales the largest numbers of any group score highest and lowest.

On only two of the six scales in the Study of Values did the students in this NDI sample make relatively high scores. The measured values of the average dental student, and the characterizations based on the definitions and validation of the scales, are as follows:

(a) The average dental student places relatively high value on a theoretical approach to learning. This is the dominant interest for him when seen in context of the other values being measured--Economic, Aesthetic, Social, Political and Religious.

He may be described as one who takes a cognitive attitude, who attempts to observe, to analyze, and to systematize what he pursues. In this respect he appears to be a knowledge seeker.[20]

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[20]The highest mean scores on the Study of Values are found on the Theoretical scale; the mean is a significant (.01 level) four points above the national undergraduate mean. Approximately three-fourths of the total sample obtain scores above the national mean; however, only forty-two per cent score highest on this scale in comparison to their own scores on the six other scales, while another 33 per cent are second highest on this.

(b) He definitely values his religious beliefs and practices, and concern with religious matters seems to be one source of meaning and satisfaction.[21]

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[21]The mean score for the NDI group is significantly higher (.01 level) than the normative group but is subordinate to the Theoretical score for the majority of individuals. Only 21 per cent score highest on the Religious scale. The means for all institutions except one are either at the mean for the total NDI sample or some distance above it.

(c) He places some value upon economic matters and interests and, to a lesser degree, he presents a "political" orientation in his thinking and relationships. Thus, his perception and attitudes are influenced by what appears utilitarian and practical, and he is interested in maintaining the status quo. In most attitudes he manifests more conservatism than liberalism.[22]

[22]The mean scores on the Economic and Political scales are approximately equivalent to the mean of the norm group, which certainly indicates no absence of these interests or values; since the raw score means are at the same level as the Religious scores, in an intra-scale sense these two may be considered as receiving almost the same emphasis, all three equally second only to the Theoretical value. However, when considering scores on the Economic and Political scales in the light of the amount of dispersion in most groups, all means obtained on the Political scale fall within a rather limited range. Thus, the level of the score for the NDI students on the Economic scale takes on more significance since the "operational" range of variation is much greater. A total of 30 per cent obtain their highest scores on these two values. Almost an additional 25 per cent score second highest on the Economic scale. Thus, over a third (40 per cent) of the group score either highest or second highest on the Economic scale.

These NDI students score lowest on the Aesthetic and Social values. Less than 10 per cent of all students obtain their highest scores on these two scales, while over two-thirds of the 615 men receive their lowest scores on these scales. All groups in the nine different institutions, except one, present equally low mean scores on both variables. It is of interest to note than the lowest mean of all is on the Social scale; in contrast, for the normative group (undergraduate college males), the mean scores on the Aesthetic and Religious scales rank at the bottom.

People high on the Aesthetic scale are aware of form and harmony and generally seek and gain satisfaction out of the artistic aspects of life.[23] The significantly

[23]Research in recent years at both the Center for the Study of Higher Education and the Institute of Personality Assessment and Research has demonstrated high scores on the Aesthetic scale to be a major component of genuine intellectual interests. Also, persons judged or known to be creative in several areas and those with definite research inclinations, both in science and in the arts, score high on both the Aesthetic and the Theoretical scales.

low scores for future dentists on the aesthetic factor lead to only one conclusion: these candidates, at least the great majority of them, have not learned to take or to place a major value upon an aesthetic outlook.

On the Social scale, which reportedly measures a concern for and interest in one's fellow man, men in general are rarely high. More than that, it is undoubtedly a score that is "forced" down due to the peculiar structure of the inventory. Norwithstanding any fallacies in measurement involved here, the students in dentistry seem to have relegated any such value, as compared to the others, to a netherly position.

A few comments in summary on the Study of Values findings may serve to integrate them with some results on the Personal Preference Schedule. As far as scholarship in dental school and the general practice of dentistry are concerned, the positive aspects of the above pattern of measured values for the NDI students are limited to the Theoretical scale. The "average student" under consideration, is to be credited with a cognitive, empirical, and possibly somewhat critical approach in his pursuit of knowledge and the skills of his future profession. However, the low Aesthetic scale scores argue against a genuine interest in scholarship and against much ingenuity or creativity in intellectual behavior. An inference in support of this contention can be drawn from the relatively high

scores on the Religious scale and the average scores on the Economic and Political scales. The whole profile may be summed up as one that correlates positively with authoritarianism, with behavioral rigidity, and with an "applied" and noncomplex orientation toward learning. Any interpretation of the relatively high Theoretical score and its implication for the behavior of dental students must be conditioned by the rest of the scores. It may be a genuine value on the part of these students, but the "search for knowledge" is seemingly circumscribed by pragmatic vocationalism.

Measured Interests

The data available from the Strong Vocational Interest Blank (SVIB) on this large group of dental students can "tell a story" of and by themselves. However, interests and patterns of interests will not be examined in great detail. The occupational scores from the SVIB will be reviewed briefly to determine whether they confirm or contradict the general personality description of dental students derived from the other two inventories. The reader is reminded that the chief virtue of this Interest Blank is that it measures the degree to which an individual's interests are similar to the measured interests of successful people in some of the major vocations and professions.

The over-all profile on the SVIB, based again on the mean scores of the total sample of students in all schools, is rather striking in the complete absence of any pronounced "sets" of interests similar to successful people in any of the occupational groups (scales). In fact, for the great majority of the occupations, the interests of the largest proportions of dental students are unlike the criterion groups, i. e., people successful in the respective occupations.[24] When one

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There are no mean scores in the A area (area indicating strongest interests) and only two or three in the B+ area, while 32 out of 45 occupational scale scores fall in the B- or C+ section, indicating less than average or low scores.

considers the major groups[25] into which the specific occupational scales are cate-

[25]For the readers generally unacquainted with the field of psychological testing, it perhaps should be said that the results on the SVIB are most efficiently used by considering the measurements simultaneously on a variety of scales and on the pattern of scores over many scales. Students genuinely interested in one profession will often score higher on other scales, for one thing, because the complexity of interests goes beyond that of successful people in a single profession.

gorized, one finds these students exhibiting the largest number of similar interests in the professional group, in the technical or skilled-trades group, and they show a varied high and low pattern in the business interest groups. On the single scale assessing the interests of dentists, the mean of these students falls approximately at the mean of the criterion group. Interestingly enough, their scores on the Physician and Osteopath scales are significantly higher, apparently indicating greater similarity of interests to the people in these professions. Some general comparisons with students in medicine will appear in the following section.

A recently developed method of analyzing the SVIB profiles, permitting classification of all subjects into three major groups and a number of subgroups, facilitates a more meaningful description of the students in a large sample such as this.[26] The underlying idea of this comprehensive analysis of SVIB scores

[26]Martin P. Weissman, "An Approach to the Assessment of Intellectual Disposition Among Selected High Ability Students," Ph. D. Dissertation, University of California, 1958.

centers in the assessment of an intellectual disposition. This disposition may vary from a broad and intrinsic interest in intellectual activity and a theoretical

orientation to knowledge to an applied orientation, where skill or knowledge is chiefly viewed as a means to an end. These two extremes are represented by categories A and C; a middle category (B), with five subcategories, includes persons whose major orientation is in the application of principles and who give only limited value to the theoretical approach and derive much less satisfaction therefrom. This B category is briefly titled the "Applied-professional" pattern.

The measured interests of the NDI dental students when classified by the above profile analysis, result in a distribution across all three major categories, as demonstrated in these figures:[27]

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[27]This profile approach was applied to 100 students drawn at random from the total dental student sample.

Category A		
Intellectual, abstract, theoretical orientation		11 per cent
Category B		
Applied-professional orientation and interests		72 per cent
B1 - Biological and life sciences	25 per cent	
B1+C - B1 with emphasis on technical application	21 per cent	
B2 - Technical-physical science	3 per cent	
B3 - Welfare	8 per cent	
B4 - Business	15 per cent	
Category C		
Applied-technical interests		17 per cent

This is probably very much in line with expectations, especially the large concentration in Category B, where the health professions are usually found.

The distribution across the subcategories under B is of interest. The most natural category for those entering dentistry would appear to be B1, where the greatest number do fall. But the other large groups, B1+C, B4, and C, accounting for over half of the total sample, present a picture of interests and inferred motivation that may not always be most conducive to the level or type of professionalism desired by dental school teachers and administrators. If the practice of dentistry demands no more than the qualities and interests chiefly typical of skilled technicians, then over a third in this sample (B1+C and C) seem to present an appropriate, somewhat nonscholarly disposition, assuming their measured interests to be a pertinent indicator.

The percentage of students whose profiles place them in Category A is not equally distributed across the nine dental schools in the sample. The relatively small number who possess this disposition seem to be attending certain institutions in much larger numbers than others; in some of the latter, their number is almost nil. From the standpoint of furthering teaching and research in dentistry, leaders in the profession might prefer to find a considerably larger percentage in the first category and a very minimal group in the third.

These results on measured interests, which show no areas of great strength for these students as a group, support the earlier conjecture regarding a general lack of scholarly motivation. In fact, it would be fair to describe the profile of the dental student group as definitely impoverished. Breadth and diversity of interests, though no doubt typical of numerous individuals, are in no sense attributes of the majority of the group. Minimal motivation toward scholastic achievement is also confirmed by an absence of any high scores which would indicate an

aesthetic perspective. It was pointed out above that this latter value, interest, or orientation is closely related to intellectualism and research inclinations.

One other conclusion to be drawn from the SVIB scores relates to the very low pattern of scores in the physical science area (four separate disciplines). In this realm, where the chief means of communication is numerical symbolism, the dental students present the lowest group of SVIB scores. To a somewhat lesser degree, the same comments are pertinent to the group of social service scales. These also are definitely subsidiary to the somewhat higher patterns found on the professional (especially health), the technical, and the business occupations. The interests of the scientist and the welfare service worker are conspicuous in their absence.

Comparisons Among Professional Groups (heavy black print)

An additional frame of reference for considering and understanding students in dentistry is provided through comparisons with groups in other professions. Scores on one or more of the personality inventories employed with the dental students were available for medical and engineering students and for several groups studying for, or presently in, the ministry. These interprofessional comparisons will be restricted to characteristics (scales) on which major differences among the groups were found.

Physicians, a high-status profession in the public's eye, provide a rather natural comparative group for dentistry. The scores for a large sample of medical students of the same year are available on all three measuring instruments.[28]

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[28]The data on medical students have been collected through the collaborative study with Dr. Helen Gee, Director of Research, Association of American Medical Colleges.

A number of interesting, distinguishing differences between the two professions are found on all inventories, although scale by scale comparisons across all the data make a basic similarity between the groups readily apparent. Beyond that the profile pattern across all scale measurements on each inventory is essentially the same. The few exceptions make for noteworthy differences. No consideration will be given here to the similarities or dissimilarities of background factors and the amount and type of previous education.

The value orientations of dental and medical student groups are unlike in that the entering medical students are considerably more theoretical and place much less emphasis upon economic matters and somewhat less upon religious beliefs and practices. The over-all profiles (6 AVL value scales) make the first-year dental student appear to be definitely more pragmatic and utilitarian than the students in medical schools. The mean score on the Economic scale for dental students ranks second only to the Theoretical scale score. Though the latter is also highest for medical students, their Economic score ranks as one of the lowest. For about half of the dental schools in this study, scores are available for the entering medical school students in the same institution (e. g., the students in both the dental and medical schools at New York University). In these particular institutions another significant difference appears on the Aesthetic scale, with the medical groups scoring considerably higher. The difference on the Religious scale is also larger than the difference obtained between the total dental and medical groups across all schools.

From the standpoint of manifest needs (Personal Preference Schedule) the dental students are most different from those in medicine in their concern for order and organization and in their general persistence and endurance. Though seemingly somewhat contradictory, they are lower than the medical students on the measured need to achieve; however, the Achievement scale measures this need or

motivation in an intellectual and in a competitve sense. This is quite different from the implications derived from the high Endurance score for the dentists. Another major difference between the groups centers in a general social submissiveness and deference to others that characterizes a great many of the dental group. They would be more likely to place blame upon themselves, to feel inferior, to seek encouragement from others and leadership in others.

As far as measured interests are indicative, the most striking pattern of differences appears in the scores of the applied-technical vocations. A second difference is found in a group of business vocations. In both cases the dental group demonstrates more of the interests that typify persons successful in these areas. In contrast, the medical students score considerably high in the professions having a verbal-linguistic emphasis and also in two scales measuring maturity of interest and the general level of their occupational interests. A point made earlier bears iteration in that the general similarity in the shape or pattern of the total profiles (45 occupational scales) is more prominent than the contrasts observed in the several major-groups mentioned.

Generalizations drawn from the measured differences between the students in the health professions include the following: the dental group appears to be somewhat more conservative than those in medicine; they are generally more persistent and certainly as willing, if not more so, to strive for what they want, in part perhaps because of greater feelings of inferiority; and the pattern of values, attitudes and interests presents them as less congenial to scholarly activity.

When the dental students are compared to engineering majors, a group which comes from rather similar socio-economic backgrounds, the measured values fall in about the same rank order, with greatest emphasis given to the theoretical, economic and political orientations. Except for the Religious scale, the over-all profile patterns for these two professional groups are very much alike. However, engineers,

when compared to dentists, place somewhat more value upon economic matters while their scores on the Religious scale are significantly lower. The measured interests of engineers differ chiefly from the future dentists in the scores obtained for a group of physical science occupations and for the health professions, with the dentists lower on the first group and higher on the second. The engineers also exhibit even higher interest scores in the technical vocation group, which would appear to be a correlate of their applied physical science interest.

The third professional group, namely the clergy, present the most distinct basis of comparison. Members of the clergy were included as a referent group to obtain some comparisons with individuals who have a social welfare orientation and a concern for their fellowmen as generally attributed to them. Scores on the Study of Values were available for three different groups, one group already established in the clergy and two groups of Protestant seminary students. The mean scores for the three clerical groups on all six scales were not significantly different; thus, the scores were combined to provide a single referent.

The profiles on measured values for people in the clergy and dental students were very dissimilar. Mean scores for the two groups were alike only on the Aesthetic scale, both groups being equally low. The dental group was considerably higher on the Theoretical and Economic scales and somewhat higher on the Political scale. The clerical group was very much higher on the Religious scale and a good deal higher on the Social. (On four of the six scales the difference between the groups is greater than one standard deviation.)

A lesser social concern on the part of these dental students, illustrated by the above differences in measured values, finds support from scores on a second inventory, the Personal Preference Schedule. Mean scores on the latter were obtained for a large group of Protestant ministers representing a number of

denominations.[29] The need "structure" of these two groups appears to be most

[29]The Personal Preference Schedule scores for a group of Protestant clergy were furnished by Dr. Clarence Mahler, Chico State College, Chico, California.

different in the way others are perceived and dealt with, with the clergy exhibiting more constructive social attitudes and a greater willingness to be helpful and to become personally involved with others. Viewed from this standpoint of human relations the dental students appear to be the less socially mature and somewhat less aware of others. This difference, however, may in part be due to the different age levels of the two groups.

In brief, the dental students have a value orientation most similar to the students in engineering, both presenting patterns of scores which describe them as giving value to knowledge more for practical than for intellectual reasons. Of the three professional groups included here they are most unlike the Protestant clergy. Judging by mean score differences on two personality inventories, the quest for knowledge, at least in a nonreligious sense, seems to receive more value from the future dentists. However, the great emphasis given by the clergy to the social and religious spheres, as contrasted by their apparent de-emphasis of economic matters, may "force down" the actual assessment of their theoretical interests. At least, along with the difference in their theoretical perspectives, these two groups differ most in the presence or lack of a social orientation and in the place given to utilitarian, economic interests.

Without presenting or discussing the specific scale comparisons, it will serve somewhat to complete the picture on type and degree of motivation to state that the measured characteristics of dental students are very different from those of the average undergraduate students attending some of the selective liberal arts

colleges in America and from many students of approximately the same level of ability (as the average dental student) majoring in physics, mathematics and the humanities. The identifying criteria of general intellectual activity, creative behavior, and genuine research interests, as observed in capable students in numerous subject areas, are not present in the "typical" first-year dental student.

Implications and Conclusions (heavy black print)

One of the three questions guiding the analyses and interpretation of the data presented on dental students asked about the implications for scholastic achievement and for meeting a need for research scientists, presumably as much in demand in dentistry as in most areas in the present age. In a sense, this question has perhaps unduly biased the presentation throughout the paper. Certainly a partial answer, based on inferences from the available data, has been written in at several points in the paper.

The author is embarrassingly unacquainted with the status and modern developments in dental research. However, if the graduates from dentistry over the years are at all typified by the measured characteristics of the NDI sample presented here, then it seems fair to conjecture that research in this one health profession probably leaves much to be desired. Even on the basis of the limited knowledge the social scientist and educator have about motivation, learning and change in behavior, it would be fairly conservative to state that the very best predental and dental education would not make provocative teachers and contributive researchers out of the vast majority of these entrants in dental schools across the nation. The ulterior motivation of upward mobility and the anticipated material advantages at a higher economic level, which motivation is evidenced by a number of the measured psychological characteristics, is not likely to lead to experimentation and risk-taking in the realm of the unknown. The achievement motivation, certainly present

in these men, together with a need to persist and endure the transition from lower economic strata to professional status, is utilitarian and practical. The basic motivation for the majority is not centered in a need for independence, in social service, in the attainment of knowledge, certainly not in a quest for new knowledge, and not in mere financial remuneration. A most general conclusion, to be read from the data obtained from all three inventories, is that the motivation is one of advancement, advancement in a socially upward direction to a perceived better way of life.

Good practitioners and technical specialists can readily be educated and trained, as is undoubtedly the case, from the student clientele as pictured here. But from the standpoint of the potentialities for research, some dental schools, if not all, will need to change their recruitment and selection procedures in order to enroll a more scholarly student body. (There was some evidence in these data to indicate that a few schools presently select a somewhat different group of students from the standpoint of motivation and attitudes.) However, changing the student body composition is much more easily suggested than accomplished. The majority of frontier research personnel perhaps must be sought from other scientific disciplines, and it might well be that teachers in essential areas are and must continue to be drawn from outside the ranks of dental education.

Assessment of personality characteristics is most likely superfluous in making many dental school faculty aware of the rather restricted motivation of their students, expecially regarding the absence of sincere intellectual interests and research inclinations for all but a minority. Undoubtedly, some dental institutions are presently educating students specifically for research and teaching, individuals who have no intentions of becoming practicing dentists, even temporarily. It is conceivable that more institutions could open their doors or recruit

students with an orientation and motivation quite different from the typical dental students described above. The theoretical-aesthetic personality (or, the Category A type as determined by the SVIB profiling method) with a specific interest in the biological sciences will seldom be found in present day dental education, but such individuals may possibly be attracted to a challenging future in research on countless problems pertinent to improved dental care and preventive dentistry.